

Tabelle 4

Panthera pardus suahelica ♀♀

1	2	3	4	5	6	7	8	9
Kenya	198	180		122		36	41	22
Nyeri	201	185		130		33	33	24
Mt. Elgon		188		127		33	43	25
Mt. Elgon	198	185		124		33	43	23
Mt. Elgon	201	185		127		33	43	24
Kigoma	203			130		36	43	25
Kigoma	185	175		122		33	43	23
Kigoma	193	173		124		33	46	22
Uvinga	191	170		112		30	38	23
Milanji	196	180		124		38	46	24
Satara	201	183		124		34	41	23
Rustenberg	190	176		122		32	39	24
Bezwe R.	198			127		43		22
Salima	200	184		122		34	43	24
Kibwezi	184	170	160	117	69	32	39	23
Usambara					74		36	22
Kilimatinde	176	162	152	111	66	28	40	22
Iringa	179			117	67	28	39	25
Iringa	177			113	66	31	41	24
Isansu	192	172	159	115	69	32	40	21
Iringa	178	164	152	112	69	29	38	20
Iringa					69	31	42	22
Muansa	185	169	157	120	69	34	40	21
Kilimatinde	182	170	150		68	32	42	21
Iringa	187	175	163	117	68	33	42	22
Kibwezi	190	172	160	111	66	29	41	22
Morogoro	192	178	165	113	69	32	44	25
V	177—203	164—188	152—165	111—130	66—74	28—43	33—46	20—25
N	24	23	9	24	13	26	26	26
D	190,7	160,7	157,5	120,1	68,3	32,7	41,0	23,7

Courtship in captive saddle-backed porpoises,

Delphinus delphis, L. 1758

By FRANK S. ESSAPIAN

Eingang des Ms. 17. 6. 1961

All too little is known of the behavior of the delphinids in captivity, except for *Tursiops truncatus*, the bottle-nosed porpoise, and *Stenella plagiodon*, the spotted or long-snouted porpoise (ESSAPIAN, 1953; LAWRENCE AND SCHEVILL, 1954; MCBRIDE AND HEBB, 1948; MCBRIDE AND KRITZLER, 1951; SCHEVILL AND LAWRENCE, 1956; TAVOLGA AND ESSAPIAN, 1957; WOOD, 1953). Aside from these, a single *Globicephala macrorhyncha*, pilot whale, was observed for a period of nine months (KRITZLER, 1952). Lately, *Lagenorhynchus obliquidens*, the striped porpoise, has been available at Marineland of the Pacific (BROWN AND NORRIS, 1956).

In the years past, several attempts were made at inclusion of *Delphinus delphis*, so-called "common dolphin", but on the American coast better known as the saddle-

backed porpoise, in the exhibit at Marineland, Florida, but invariably the animals perished in a matter of days. One of the more successful attempts was made during the early spring of 1954, and this writer was able to extend his previous observations.

D. delphis at capture

The first animal, a young female *Delphinus*, 173 cm long, was captured by means of a specially designed tail snare on 9 March 1954, at sea, about ten miles east of St. Augustine, Florida, and delivered apparently unharmed to Marineland. There she was placed in a receiving tank, approximately 12 m long, 6 m wide, and 1.2 m deep. This tank connects by means of screened gates with a circular tank which houses the porpoises at one end, and a large rectangular tank mostly populated by fishes and large elasmobranchs, at the opposite end.

As soon as the animal was lowered into the water and had oriented itself in the new surroundings, it resorted to a rapid circling movement in an area not much greater than its length, close to the rectangular tank. The *Tursiops* in the adjoining circular tank have grown accustomed to examine all new arrivals in the receiving tank through the screen in the gate, and were now demonstrating their curiosity by their presence there. The young *Delphinus* maintained its circular movements for extended periods, squealing continuously and changing her station only momentarily, when startled.

On 11 March 1954, an adult male *Delphinus*, measuring 196 cm, was captured in the same locality, and introduced into the receiving tank. This animal also appeared to be in good health, but had some unusual piebald markings on its body (ESSAPIAN, 1954). The two animals did not associate at first, but remained at opposite ends of the tank, each circling in its chosen area. In about fifteen minutes the male began approaching and investigating his companion, rubbing slightly against her, and soon both animals started circling the entire tank side by side. They took their first meal of dead fish on 15 March, all previous attempts to induce them to feed on dead or live fish and dead squid having been unsuccessful. From then on their daily intake of food increased progressively to as many as fifty butterfish (Fam. Stromateidae) each per day.

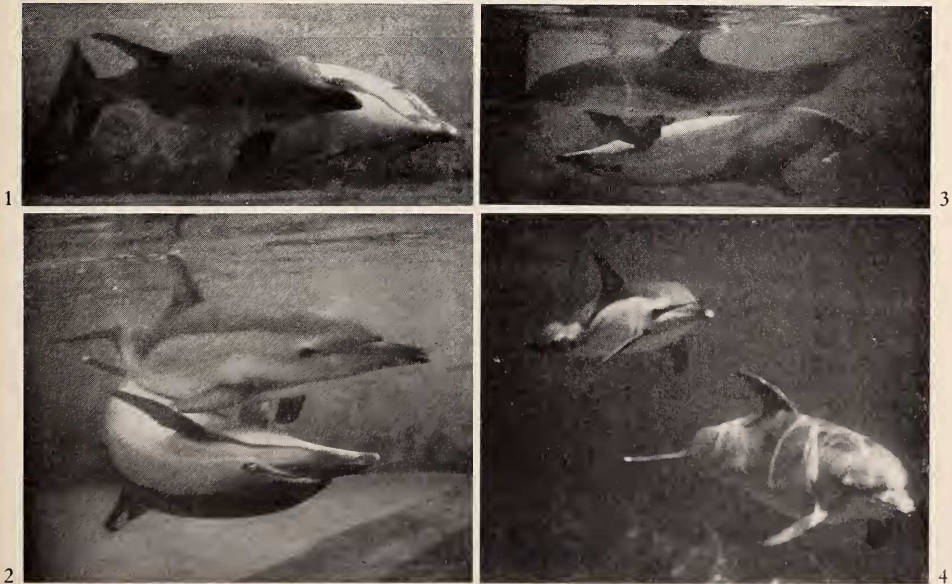
Courtship and mating behavior

Since the *Tursiops* at Marineland mate during the months of February to May inclusive, a great deal of disturbance is occasioned by the porpoises in the circular tank. It was therefore deemed safer to retain the *Delphinus* in the receiving tank to avoid possible injury to them. Also, it was felt that in the relative privacy of their enclosure it would be easier to tame the animals to a greater degree.

While this writer's attention was preoccupied by the observations of the mating and reproductive behavior of the *Tursiops* in the circular tank, the pair of *Delphinus* was engaged in similar courtship activities in the receiving tank. This activity was initiated during the later part of March, and was carried on through the month of April. The general pattern of this behavior is very similar to that of *Tursiops*, inasmuch as the animals of both sexes do actively seek to arouse the opposite sex, and employ the same means to bring it about. The male *Delphinus* usually initiated the courtship activity by swimming briskly about the tank and by slapping his flukes against the surface of water. He would next rush at the female, meeting her head on, and bring his body into a close gliding contact with that of the female, repeating

this exercise a number of times in quick succession. This was usually followed by periods of intense flipper stroking activity whereby, swimming close together, one at a time or both simultaneously would commence moving the flippers rhythmically against the other's. Later, the flipper stroking was extended to genital parts. Often one or the other would swim on the side or back, and rub the ventral surface of its flukes against the stiffly held flipper of its mate. The courtship activity took place during different hours of the day, and probably during the night, and lasted from several seconds to several minutes at a time. On one occasion, a very intense activity continued for eighteen minutes, accompanied by occasional squeals, low leaps out of water, and slapping of flukes against the surface of water. Rapid twists and turns were employed by both animals, as a result of which different parts of their bodies were brought into physical contact. Frequently, at completion of respiration, the porpoises also slammed the sides of their heads with great force against the surface of water. The slamming of heads did not occur simultaneously, but usually followed one another. At no time during these intense courtship activities did the male exhibit an erection.

The first attempt at copulation was reported on 18 April, and thereafter it was possible to make a number of observations. On the morning of 24 April, the pair was observed in copulating positions three times within a fifteen minute interval, after which the animals became separated. Later in the day the intense courtship activity was resumed again with periodic attempts at copulation. On 27 April, at least a dozen attempts at copulation were made during a thirty minute period of observation. The male persistently followed the female everywhere, rubbed against her and stroked his flippers against her. The female reciprocated his advances. He then would flip over on his left side and the female would assume a like position on her right side, and both animals brought their genital regions in a close alignment (Fig. 1). In another more frequently practiced position, the male turned on his back,



Figs. 1-3. *Delphinus delphis* in copulating position. In figure 1 the male is in the background, in figures 2 and 3 he is on his back under the female (phot. ESSAPIAN). Fig. 4. Male *Tursiops*, "Algie", followed by the female *Delphinus* (phot. ESSAPIAN)

swimming directly under the female (Fig. 2 and 3). They continued swimming or coasting in this manner from five to ten seconds. Aside from the occasional movement of their flukes, the animals remained perfectly still. At no time were pelvic movements or thrusts employed by either animal. When the animals disengaged, the tip of the male's penis could be seen protruding an inch or two, and was then quickly withdrawn. The animals resumed their normal swimming positions, surfaced for air, only to return to the copulating activity once again. At intervals, the female, flipping on her side, would stroke the male's genital region with the tip of her flipper or her snout. No full erection was seen by this observer at any time.

Beginning 2 May 1954, for no apparent reason, the male *Delphinus* showed a lack of interest in food, and after a day of total abstinence was discovered dead on the evening of 5 May.

The subsequent behavior of the female

During the intervening period from 5 to 18 May, when it was decided to transfer the female to the circular tank, she remained extremely tense, squealing loudly for prolonged periods, and swimming about at a very rapid rate. Even though her daily intake of food diminished slightly, she became tame enough to take food out of an attendant's hand.

When she was eased through the gate into the circular tank, she came to an abrupt halt, and after a few seconds of hesitation broke into a fast swim around the periphery of the tank. She was careful not to collide with the *Tursiops*, and in fact avoided them at every turn. While she was not molested by any of the *Tursiops*, she appeared exceedingly nervous and continued to squeal uninterruptedly. Soon the *Tursiops* began to evince a real interest in the *Delphinus* by swimming into her path, and by approaching her closely. These attempts only intensified her discomfort, and she swam away from them with a spurt. She lost all interest in food. She was reported squealing all night, and during the next day she continued to exhibit symptoms of fright as the *Tursiops* came near. She remained on guard, swerving abruptly to right or left at the approach of the *Tursiops*, always with a spurt of speed. Towards the end of the day she slackened her speed, and stopped squealing. She still refused the food proffered to her.

On the third day, two young *Tursiops*, both born and reared in the tank, a male "Algie", five years old, and a female "Spray", seven years old, made several determined attempts to approach the *Delphinus*. While she discouraged their advances repeatedly, her fears had subsided considerably, and she was no longer thrown into a panic at their approach.

On the morning of 21 May, the fourth day in the circular tank, the *Delphinus* was observed swimming with "Algie" (Fig. 4) rubbing against him, and stroking her flippers against him. Whenever "Algie" chose to join one or the other of the *Tursiops*, the *Delphinus* at once separated from "Algie" and started squealing loudly. However, no sooner would "Algie" make a move to break away from the other *Tursiops*, than the *Delphinus* would quickly swim to him and stop squealing. She adapted herself to his swimming rate and held her flipper stiffly against his body. Soon she would start rubbing herself against "Algie's" flippers until they were joined by other *Tursiops*. She then deserted him at once and resumed her steady, loud squealing.

Other *Tursiops*, including "Spray" and two one-year old females, attempted repeatedly to approach the *Delphinus*, but she invariably shifted her course with a spurt. "Spray" then would initiate a series of rushes at the *Delphinus*, each time trying to

nip her flukes. One of the adult female *Tursiops* clapped her jaws in displeasure each time she found herself close to the loudly squealing *Delphinus*. Aside from the discomfort arising from the *Tursiops*' attempts to approach her, the *Delphinus* also reacted readily to the disturbances resulting from the intraspecific activity of the *Tursiops*. Clapping jaws, vocal chatter, rapid pursuits and leaps about the tank, etc., caused the *Delphinus* to accelerate her speed and to change her course repeatedly.

During the subsequent days she took a few fish tossed into her path, but displayed no real interest in food and made no efforts to compete for it with the onrushing *Tursiops*. Her attachment to "Algie" grew stronger, although on occasion she was observed swimming under "Spray", who piloted her away and around the points of disturbances. However, the *Delphinus* displayed a definite preference for "Algie", and no sooner did "Algie" appear alone near her than she quickly shifted to him. The *Delphinus* soon extended her advances to "Algie's" genital region, which she mouthed repeatedly. "Algie" inserted her flukes and the tip of her dorsal fin into his genital slit, but at no time attempted to copulate with her. Instead, "Algie" transferred this activity to the young *Tursiops*, exhibiting erections and attempting to mount them again and again.

By 25 May, the *Delphinus* and the *Tursiops* had become accustomed to each other's presence in the tank, so that most of the *Tursiops* ignored her presence, and the *Delphinus* was able to rest easier. She evinced interest in none of the diversions practiced by the *Tursiops*, but continued to seek out "Algie" and squealed over extended periods of time until "Algie" rejoined her, when she relaxed.

In the following days it had become apparent that the *Delphinus* could not long survive without proper nourishment, as she presented a famished appearance, and when she failed to take food altogether, her doom was unavoidable. During the early hours of 30 May her death was witnessed by an attendant who described her settling gently to the floor, tail sagging first, and air bubbles emanating from her blowhole. The *Tursiops* had at once become aware of her death as they schooled and looked down at the *Delphinus* every time they passed over her. "Algie" was observed making attempts to raise the dead *Delphinus* to the surface with his snout at least three times in succession.



Fig. 5. Vaginal plug from the *Delphinus*
(phot. ESSAPIAN)

The autopsy disclosed no diseased organs, except for a flat stone-like formation, approximately 5 cm long and 3 cm wide, which was found in the vagina (Fig. 5). Speaking of *Delphinus delphis*, TOMILIN (1957, pp. 524–525) states: "In some instances impregnation of the females is impossible because the vagina, becomes stoppered up with a stony plug (M. M.

SLEPZOV, 1941; V. E. SOKOLOV, 1953). Of 221 sexually mature females examined on the Black Sea during the summer of 1949, 10 individuals (4.5 %) had plugs in their vaginas measuring from 11 to 67 mm in length, and from 9 to 48 mm in diameter. These plugs consisted 55 % of organic material, and 45 % of mineral substance, in the main sulphates (V. E. SOKOLOV, 1953)."

Discussion

A number of authors (BROWN AND NORRIS, 1956; HUBBS, 1953; McBRIDE, 1940; MOORE, 1955; SEBENALER AND CALDWELL, 1956; TAVOLGA AND ESSAPIAN, 1957) have dwelt upon the social aspect of behavior among delphinids, both in captivity and in the wild, and especially as it affects these manifestations of cooperation when in distress or on death.

A better understanding of these manifestations may be gained if it is pointed out that the Marineland porpoises always exhibited definite tendencies toward selective pairing. The close association between two pairing individuals, other than mother-filial relationship or a temporary mating union, was the more remarkable since it was not restricted in its composition either by the age, sex, dominance order, or even the species of the participating delphinids. Most of the unions proved very enduring, extending over a period of weeks, months, and even years, and were frequently resumed again after a lapse of time. At Marineland the *Tursiops* were always numerically in preponderance, and sooner or later the newcomers of the same or of a different species usually paired with one or another of the older residents. These pairing animals, which usually spent the night swimming together, exhibited their attachment and concern for one another on numerous occasions and in many different ways. The protective behavior was especially pronounced on the part of a mate which had paired with a mother and its young. As an example of such behavior, an instance may be cited in which an infant would break away from the group and attempt to approach a diver at work in the tank. As often as not, it was the mother's mate-companion that rushed swiftly to the scene in order to crowd the infant away from the diver. Other adults, already in the area, would ignore the straying infant. This guardian animal would then remain at the scene and run interference as the baby repeatedly attempted, sometimes successfully, to approach the diver again.

Some of the most interesting manifestations of response toward the animals in distress, by their present or onetime mates, occurred when the dominant bull *Tursiops* persecuted a young male *Tursiops*. Clapping his jaws, the attacking bull usually rushed at his victim, chasing him about the tank, butting, biting, striking him with powerful flukes, and throwing him forcefully against the wall of the tank in a recurrent series of assaults. When these attacks occurred, most of the animals usually grouped together and shied away from the scene, but on some occasions certain individual animals either displayed their displeasure, or even attempted to intercede or to distract the bull. On few such occasions, a dominant female clapped her jaws in displeasure, and another time this same animal intercepted the bull during the attack and stroked her flippers against the bull. On two separate dates, another female approached the bull during the attack and struck the bull with her flukes, which resulted in herself being pursued briefly. Sometimes a male *Stenella plagiodon* swam in rapid, tight circles about the bull during the attacks in an obvious attempt to distract the bull. This was in no sense a self-sacrificial effort, for the bull *Tursiops* could never overtake the swift *Stenella*, no matter how hard he tried. Once the attack had subsided, some of these interceding animals could be seen swimming with the young *Tursiops*.

In other situations, for instance, some female *Tursiops* in late pregnancy were observed lying prostrate on the floor of the tank for an unknown reason, remaining there for as long as two or three minutes. Apparently a voluntary act, it usually evoked immediate response from its accompanying mate who, often joined by other individuals, attempted to raise the prostrate animal from the floor.

McBRIDE (1940) records a striking manifestation of recognition between two male *Tursiops* which were captured together and had been in the tank for a period of a month, when the smaller of the two was removed from the tank. Three weeks later, when this animal "... was released in the tank, the greatest amount of excitement on the part of the larger male was exhibited. No doubt existed that the two recognized each other, and for several hours they swam side by side rushing frenziedly through the water, and on several occasions they leaped completely out of water. For several days, the two males were inseparable and neither paid any attention to the female".

It would seem from the foregoing that it is in the light of background relationships between individual animals that a particular manifestation, such as raising of one animal by another, may be understood. Such solicitude as shown by a mother to its dead offspring is understandably a fine example of devotion in mother-filial relationship. But the friendship between the *Delphinus* and the *Tursiops*, it seems to us, is an extraordinary example of the extent of the security, trust, and devotion that animals of two different species may place in one another after a brief period of association.

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Summary

The courtship and copulation of captive *Delphinus delphis* is described, as well as interspecific relationships with *Tursiops truncatus* in captivity.

Zusammenfassung

Werbung und Paarung gefangener *Delphinus delphis* werden beschrieben, desgleichen die zwischenartlichen Beziehungen zu *Tursiops truncatus* in Gefangenschaft.

Literature

BROWN, D. H. and K. S. NORRIS (1956): Observations of captive and wild cetaceans; Journ. Mammal., 37, 3, pp. 311–326. — ESSAPIAN, F. S. (1953): The birth and growth of a porpoise; Natural History (New York), 62, 9, pp. 392–399. — ESSAPIAN, F. S. (1954): A common dolphin – uncommonly marked; Everglades Natural History, 2, 4, pp. 220–222. — HUBBS, C. L. (1953): Dolphin protects dead young; Journ. Mammal., 34, 4, p. 498. — KRITZLER, H. (1952): Observations on the pilot whale in captivity; Journ. Mammal., 33, 3, pp. 321–334. — LAWRENCE, B. and W. E. SCHEVILL (1954): Tursiops as an experimental subject; Journ. Mammal., 35, 2, pp. 225–232. — McBRIDE, A. F. (1940): Meet Mr. Porpoise; Natural History (New York), 45, 1, pp. 16–29. — McBRIDE, A. F. and D. O. HEBB (1948): Behavior of the captive bottle-nosed dolphin, *Tursiops truncatus*; Journ. Comp. and Physiol. Psychology, 41, 2, pp. 111–123. — McBRIDE, A. F. and H. KRITZLER (1951): Observations on pregnancy, parturition, and post-natal behavior in the bottlenose dolphin; Journ. Mammal., 32, 3, pp. 251–256. — MOORE, J. C. (1955): Bottle-nosed dolphins support remains of young; Journ. Mammal., 36, 3, pp. 466–467. — SCHEVILL, W. E. and B. LAWRENCE (1956): Food-finding by a captive porpoise *Tursiops truncatus*; Breviora 53, pp. 1–15. — SIEBENALER, J. B. and D. CALDWELL (1956): Cooperation among adult dolphins; Journ. Mammal., 37, 1, pp. 126–128. — TAVOLGA, M. C. and F. S. ESSAPIAN (1957): The behavior of the bottle-nosed dolphin (*Tursiops truncatus*): Mating, pregnancy, parturition and mother-infant behavior; Zoologica (New York), 42, 1, pp. 11–31. — TOMILIN, A. G. (1957): Kitoobraznye [Cetacea]. Zveri SSSR i prilozhashchikh stran [Mammals of the USSR and adjacent countries]; 9, pp. 1–756, Moskva, Akad. Nauk SSSR. — WOOD, F. G. Jr. (1953): Underwater sound production and concurrent behavior of captive porpoises, *Tursiops truncatus* and *Stenella plagiodon*; Bull. Marine Sci. Gulf & Caribbean, 3, 2, pp. 120–133.

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Observations on a Minke Whale (*Mammalia, Cetacea*) from the Antarctic

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On board the f. f. "Willem Barendsz" of the Netherlands Whaling Company Ltd., during the season 1959–1960, we had the opportunity to make a study of a small type of the baleen whale, which showed much resemblance with the Minke Whale, *Balaenoptera acutorostrata* Lacépède, 1804 (*Balaenoptera rostrata* Fabricius, 1780). Beside